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Testimony

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SALTON SEA STABILIZATION AND WATER QUALITY IMPROVEMENT:

THE ROLE OF THE UNIVERSITY OF CALIFORNIA

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Introduction: This testimony presents information on the proposed role of the University of California in the coordination and conduct of research addressing solution options to the stabilization and water quality improvement of the Salton Sea. It represents not only the relevant research resources in faculty expertise, programs, and facilities of the Riverside campus of the University of California, but in addition, the resources of the entire University of California system.

While there have been a number of independent research activities and assessments made on the Salton Sea over the last several years, a continual challenge to determining viable options to solve the problems has been the complexity of the issues involved. These issues include hydrology, engineering, biological/ecological systems, soil and toxics chemistry, bioremediation, salinity and wastewater management, economics, agricultural interests, and human social/cultural considerations. Although good scientific evaluations and baseline data are available to address some component aspects, the major gap in our ability to advise policy makers is a holistic analysis of potential solutions. A holistic approach that integrates the component issues to determine and implement the best solution must be followed in order to understand the 'cause-effect-solution' relationships for all component parts. For example, a solution to stabilizing salinization and elevation of the Salton Sea can be designed effectively from the engineering standpoint, but that design must be made while understanding the implications for the biological and ecological systems, and within a full economics context.

Until now, the proposed options, including their evaluations, have lacked an integrated and interdisciplinary understanding. The University of California proposes to provide the objective forum and a core of scientific

expertise to pursue a comprehensive, research-based analysis of the primary proposals for solutions. We believe such an integrative and inter-disciplinary approach will allow the policy makers to make the most rational and informed decisions for a solution. This approach will serve the best long-term interests of the state and the nation, from environmental, cultural, and economic perspectives.

Faculty research expertise: About 25 faculty at UC Riverside have expertise bearing on the many complex issues which face the Salton Sea. We have prepared a directory of researchers at UCR, ranging from soil and water scientists who study such issues as salinity and drainage, to engineers who may deal with wastewater treatment or bioremediation, to biologists who are looking at the impact on fish and birds, to economists who evaluate issues related to resource management and the future development of the region. We are in the process of compiling a directory of programs and expertise for the entire UC system, within which is found 12 percent of the water-related expertise in the country. We have initiated contact with scientists at Berkeley, Davis, Irvine, UCLA, San Diego, Santa Barbara, and Los Alamos. These scientists represent the full range of specialized knowledge and research capability needed to provide the comprehensive, objective analyses to target the solution and to fully understand its environmental, economic, and cultural implications. To accomplish this, the coordination of scientists from several UC campuses as well as other institutions and agencies will be necessary. As described in the introductory remarks, the problems facing the Salton Sea are so complex that it will take more than one entity to solve them.

The University of California is the state's land grant institution. As such, it is our mission to provide the educational, research, and public service programs which can help policy makers such as this Congressional subcommittee deal with problems such as the Salton Sea. The University is well positioned to serve in the role of "honest broker," providing coordination of research efforts and offering sound, scientific based information. Therefore, we propose to coordinate both internally, among our campuses and national laboratories, and with state and federal agencies and other universities.

Program expertise and Facilities: In addition to our faculty expertise, the University of California has a number of programs and facilities relevant to the Salton Sea:

The Salinity and Drainage Research Program, headquartered at UCR, was initiated in 1985 to mobilize a team of experts to address critical agricultural and environmental problems in the San Joaquin Valley. Working closely with state and federal agencies, this consortium of scientists is developing, interpreting, and disseminating research-based information on salinity, drainage, selenium, and other toxic element problems similar to those found at the Salton Sea.

The University's Water Resources Center, founded in 1957, is a multi-campus research unit established to stimulate and support research on water related issues. Its broad research focus includes conservation, development, management, distribution, and utilization of water resources with a view to their optimum present and future use. The Water Resources Center maintains close relationships with governmental agencies, quasi-public organizations, and other research institutions for the purpose of keeping both the University and outside organizations aware of one another's activities.

The U.S. Salinity Laboratory, a USDA facility located on the Riverside campus, is the only research facility in the nation devoted specifically to the study and amelioration of salinity and pesticide related agricultural and environmental problems. We have discussed with the U.S. Salinity Lab the desirable collaborative involvement in the Salton Sea effort of their scientists, many of whom have adjunct appointments at UC Riverside.

UC MEXUS, or the University of California Institute for Mexico and the United States, is another multi-campus research unit, headquartered at UCR. UC MEXUS has recently undertaken a long-term research focus on binational issues of water and the environment in the California-Mexico border region, including the lower Colorado River basin. The binational, policy oriented focus of UC MEXUS will be critical to assessing and implementing any solution that involves Mexico.

A newly formed Center for Conservation Biology at UCR is intended to assist in the conservation of species and ecosystems for the benefit of society by facilitating the collection and dissemination of objective, scientific information. The Center seeks to provide information to guide the development of sound public policy for addressing conflicts such as the Salton Sea. Several dozen UCR faculty--ecologists, entomologists, botanists, population biologists, soil scientists, engineers, natural resource specialists and others--comprise a rich pool of academic talent and expertise aimed at assisting Southern California address these problems.

UCR's 540-acre Coachella Valley Agricultural Research Station is just four miles from the north shore of the Salton Sea, offering nearby research facilities. These facilities could be used to serve collaborative research efforts involving scientists from other UC campuses and other universities and state and federal agencies.

Coordination and Research plan: Because of this concentration of programs and expertise, and because of our proximity to the Salton Sea, UC Riverside has been asked to coordinate research efforts for the UC system. In addition, we will coordinate with state and federal agencies and other universities. The University is now in the process of garnering internal and external resources to pull together an action team of UC and other scientists. Using this as seed money, we hope to attract state and federal funding as well. Historically, it has been shown that state and federal support for University programs is leveraged 4:1 by UC resources of scientists, staff, facilities, equipment, and funds.

Research: We see three broad areas in which research is imperative to the eventual solution of the Salton Sea. These are water, biology, and economics. As illustrated in Attachment 1, these issues are overlapping. You cannot look at engineering a solution to stabilize the Sea's elevation, for example, without considering the hydrology, economics, and the impact on fish and waterfowl. By providing a forum for scientific exchange, the University can help both to look at the overall picture, and to integrate the research that has been conducted in each of these broad areas. It is at the intersection of these three issues that the solution to the Salton Sea must lie. It is at this nexus where good public policy decisions can be made.

Although the Salton Sea has already been studied in some detail (fine studies have been done by the Bureau of Reclamation, various consultants, and most recently Los Alamos National Laboratory), the needed multidisciplinary, comprehensive approach that we propose has not been put into action. What we propose to do that is different from previous studies is to marshal the interdisciplinary scientific expertise into an action oriented approach along a defined timeline, as follows.

Action Plan: We envisage a four-phase, long-term process, as summarized in Attachment 2. We have identified timelines here, but it must be stressed that the phases--like the subject areas in Attachment 2--may be overlapping and flexible.

Phase I is the evaluation phase. We propose to look at existing data to determine what is known and where the gaps are. The purpose is to integrate priorities across disciplines, as described above. The timeframe is

short: 2-3 months. Likewise, this phase is relatively inexpensive, costing \$25,000-\$50,000 to bring together a team of scientists to review existing research and make recommendations. While we recognize that some attempts at this have been made that added to the information base, most recently the summit in Palm Springs coordinated by the U.S. Fish and Wildlife Service, there were important gaps in represented expertise such as economics.

Phase II is the testing phase. The feasibility of proposed options will be tested by conducting solution-oriented and demonstration research. This may be done by modeling or, in some cases--such as constructed wetlands--by field testing. The purpose is to evaluate solutions to enable policy makers to decide on a course of action. The timeframe could be 1-3 years, and the research testing of various solution components could be conducted in a staged manner. For example, evaluation of some solution components such as wetlands and habitat restoration, could be done at the same time primary solution components such as pipeline or impoundment engineering were already being implemented. Effective coordination of the testing will be vital. The scientific summit recently held by the U.S. Fish and Wildlife Service estimated the cost of research to be as much as \$40 million, but it could be considerably less, pending the outcome of Phase I.

Phase III is the implementation phase. It is not the University's role to implement the solution to the Salton Sea, but rather to conduct research to assess how well the solution is working as it is being implemented. The purpose of such research is to determine if the solution is performing as expected and what adjustments, if any, need to be made. The estimated timeframe is 2-5 years, but could be longer. The cost of the solution itself ranges widely, depending on the option(s) chosen. The cost of research during this phase would be only a small fraction of the cost of the selected solution.

Phase IV is the long-term management and monitoring phase. Once a solution is implemented, we cannot simply walk away. The University will be here for the long haul, evaluating the solution and its hydrological, biological, and economic impacts over the long term. The longer term commitment under this phase is compatible with the University's responsibility as the land grant institution for the state of California. It will provide a continuing objective scientific partner for the Salton Sea region as a whole, with the overall sustained health of the Salton Sea as a motivational force. The timeframe, of course, is indefinite, and the cost a small percentage of the operating costs of any solution which is implemented.

The four-phase approach is necessary whatever the chosen solution. The possible courses of action include not only the active salinity and elevation management approaches, but also the option to allow the Salton Sea to salinize (see Attachment 3, fact sheet). In the event that this becomes the option chosen by policy makers, it too would require important research-based inputs for its management. For example, lowering nutrients and pathogens entering from river-inflow and improving waterfowl habitat along the rivers and delta would require testing.

Programmatic mechanism: Our proposed plan is action-based and solution-targeted, recognizing the immediacy of the problem and the need for rapid policy decisions. We propose to coordinate the Salton Sea efforts through an existing University-wide program structure that will provide a flexible and responsive vehicle for scientific exchange as well as research coordination and funding. The UC Centers for Water and Wildland Resources is a multi-campus research unit that focuses activities on solving priority problems in agriculture, natural resources, and human development throughout California. It provides an umbrella mechanism for research and scientific exchange for four distinct programs dealing with water and wildland issues. One existing program under the Centers is the highly successful Salinity/Drainage Research Program, described earlier. After consultation with the leadership of the Centers and the UC Division of Agriculture and Natural Resources, we have determined that the Salton Sea action program outlined here should be a

new branch of the Centers for Water and Wildland Resources. This branch will be headquartered at UC Riverside. It will take advantage of the experienced programmatic structure in place, and it will have independence from existing programs to facilitate its responsiveness to the proposed timeline for action. Our ability to provide this much-needed coordination and action program is dependent upon our ability utilize University seed money and expertise to attract new state and federal resources.

Summary: This testimony has outlined a plan for how the University can best serve the state of California and, indeed, the nation, in dealing with the Salton Sea. The University of California is the only entity with the full breadth and depth of expertise required in the needed areas of biology, economics, soil and water/engineering. It can bring to bear expertise, facilities, and programs, including a coordinating program structure, as well as some seed money. The plan will overcome existing coordination problems, whereby UC and other scientists have been responding on an ad hoc basis. The University will provide objective, scientific-based research information to help policy makers form decisions, and coordinate across entities, with no agenda or bias of its own. Finally, the proposed research will be done in parallel with the chosen solution along the phased timeline.

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